CLAIMS

WE CLAIM:

1. A peptide having an amino acid sequence selected from the group consisting of:

RVVRVVRRVVRR (SEQ ID NO:4)

RRVVRRVRRVVRRVVRVVRRVVRR (SEQ ID NO: 5);

VRRVVRRVVRVVRRVVRRVRRVVRRVVRVVRRVVRR (SEQ ID NO: 6);

RRVVRRVRRVVRRVVRVVRRVVRRVRRVVRRVVRVVRRVVRR (SEQ ID NO:7);

RVVRVVRRVVRRVRRVVRRVVRVVRRVVRRVRRVVRRVVRVVRRVVRR (SEQ ID NO:8); RVVRVVRRWVRR (SEQ ID NO:9); RRWVRRVRRVWRRVVRVVRRWVRR (SEQ ID NO:10); VRRVWRRVVRVVRRWVRRVRRVWRRVVRVVRRWVRR (SEQ ID NO:11); and RVVRVVRRWVRRVRRVWRRVVRVVRRWVRRVRRVWRRVVRVVRRWRVV (SEQ ID NO:12).

2. The peptide of claim 1 having the amino acid sequence:

RVVRVVRRVVRR (SEQ ID NO:4)

3. A composition comprising the peptide of claim 2 and a carrier.

4. The peptide of claim 1 having the amino acid sequence:

RRVVRRVRRVVRRVVRVVRRVVRR (SEQ ID NO: 5).

5. A composition comprising the peptide of claim 4 and a carrier.

6. The peptide of claim 1 having the amino acid sequence:

VRRVVRRVVRVVRRVVRRVRRVVRRVVRVVRRVVRR (SEQ ID NO: 6).

7. A composition comprising the peptide of claim 6 and a carrier.

8. The peptide of claim 1 having the amino acid sequence:

RRVVRRVRRVVRRVVRVVRRVVRRVRRVVRRVVRVVRRVVRR (SEQ ID NO:7);

9. A composition comprising the peptide of claim 8 and a carrier.

10. The peptide of claim 1 having the amino acid sequence:

RVVRVVRRVVRRVRRVVRRVVRVVRRVVRRVRRVVRRVVRVVRRVVRR (SEQ ID NO:8).

11. A composition comprising the peptide of claim 10 and a carrier.

12. The peptide of claim 1 having the amino acid sequence:

RVVRVVRRWVRR (SEQ ID NO:9).

13. A composition comprising the peptide of claim 12 and a carrier.

14. The peptide of claim 1 having the amino acid sequence:

RRWVRRVRRVWRRVVRVVRRWVRR (SEQ ID NO:10).

15. A composition comprising the peptide of claim 14 and a carrier.

16. The peptide of claim 1 having the amino acid sequence:

VRRVWRRVVRVVRRWVRRVRRVWRRVVRVVRRWVRR (SEQ ID NO:11);

17. A composition comprising the peptide of claim 16 and a carrier.

18. The peptide of claim 1 having the amino acid sequence:

RVVRVVRRWVRRVRRVWRRVVRVVRRWVRRVRRVWRRVVRVVRRWRVV (SEQ ID NO:12).

19. A composition comprising the peptide of claim 18 and a carrier.

20. The peptide of claim 1 wherein said peptide has antimicrobial activity.

21. The peptide of claim 1 wherein said peptide has antimicrobial activity in low salt.

22. The peptide of claim 1 wherein said peptide has antimicrobial activity in physiologic salt.

23. An LLP-1 peptide analog wherein said peptide is modified to optimize amphipathicity.

24. An LLP-1 peptide analog, said peptide comprising an arginine residue on said peptide's charged face, wherein said arginine residue is substituted with another amino acid residue and wherein said peptide analog comprises an amphipathic α-helical structure.

25. An LLP-1 peptide analog, said peptide comprising a tryptophan residue on said peptide's hydrophobic face, wherein said tryptophan residue is substituted with another amino acid residue and wherein said peptide analog comprises an amphipathic α-helical structure.

26. An LLP-1 peptide analog, said peptide comprising a valine residue on said peptide's hydrophobic face, wherein said valine residue is substituted with another amino acid residue and wherein said peptide analog comprises an amphipathic α-helical structure.

27. An LLP-1 peptide analog, said peptide comprising a tryptophan residue and a valine residue on said peptide's hydrophobic face, wherein said tryptophan residue and said valine residue is substituted with another amino acid residue and wherein said peptide analog comprises an amphipathic α-helical structure.

28. An LLP-1 peptide analog, said peptide comprising additional residues to increase its length, wherein said peptide analog comprises an amphipathic α-helical structure.

29. A solid phase substrate comprising at least one peptide selected from the group consisting of:

RVVRVVRRVVRR (SEQ ID NO:4)

RRVVRRVRRVVRRVVRVVRRVVRR (SEQ ID NO: 5);

VRRVVRRVVRVVRRVVRRVRRVVRRVVRVVRRVVRR (SEQ ID NO: 6);

RRVVRRVRRVVRRVVRVVRRVVRRVRRVVRRVVRVVRRVVRR (SEQ ID NO:7);

RVVRVVRRVVRRVRRVVRRVVRVVRRVVRRVRRVVRRVVRVVRRVVRR (SEQ ID NO:8); RVVRVVRRWVRR (SEQ ID NO:9); RRWVRRVRRVWRRVVRVVRRWVRR (SEQ ID NO:10); VRRVWRRVVRVVRRWVRRVRRVWRRVVRVVRRWVRR (SEQ ID NO:11); and RVVRVVRRWVRRVRRVWRRVVRVVRRWVRRVRRVWRRVVRVVRRWRVV (SEQ ID NO:12).

30. The solid phase substrate of claim 29 wherein the peptide is:

RVVRVVRRVVRR (SEQ ID NO:4)

31. The solid phase substrate of claim 29 wherein the peptide is:

RRVVRRVRRVVRRVVRVVRRVVRR (SEQ ID NO: 5).

32. The solid phase substrate of claim 29 wherein the peptide is:

VRRVVRRVVRVVRRVVRRVRRVVRRVVRVVRRVVRR (SEQ ID NO: 6).

33. The solid phase substrate of claim 29 wherein the peptide is:

RRVVRRVRRVVRRVVRVVRRVVRRVRRVVRRVVRVVRRVVRR (SEQ ID NO:7).

34. The solid phase substrate of claim 29 wherein the peptide is:

RVVRVVRRVVRRVRRVVRRVVRVVRRVVRRVRRVVRRVVRVVRRVVRR (SEQ ID NO:8).

35. The solid phase substrate of claim 29 wherein the peptide is RVVRVVRRWVRR (SEQ ID NO:9).

36. The solid phase substrate of claim 29 wherein the peptide is RRWVRRVRRVWRRVVRVVRRWVRR (SEQ ID NO:10).

37. The solid phase substrate of claim 29 wherein the peptide is VRRVWRRVVRVVRRWVRRVRRVWRRVVRVVRRWVRR (SEQ ID NO:11).

38. The solid phase substrate of claim 29 wherein the peptide is RVVRVVRRWVRRVRRVWRRVVRVVRRWVRRVRRVWRRVVRVVRRWRVV (SEQ ID NO:12).

39. The solid phase substrate of claim 29 wherein said solid phase substrate is a prosthetic device.

40. The solid phase substrate of claim 39 wherein the prosthetic device is a prosthetic joint.

41. The peptide of claim 1, said peptide comprising at least one cysteine residue.

42. The peptide of claim 41 wherein said peptide is a disulfide linked dimeric peptide.

43. A peptide-cargo complex comprising a cargo and a peptide selected from the group consisting of:

RVVRVVRRVVRR (SEQ ID NO:4)

RRVVRRVRRVVRRVVRVVRRVVRR (SEQ ID NO: 5);

VRRVVRRVVRVVRRVVRRVRRVVRRVVRVVRRVVRR (SEQ ID NO: 6);

RRVVRRVRRVVRRVVRVVRRVVRRVRRVVRRVVRVVRRVVRR (SEQ ID NO:7);

RVVRVVRRVVRRVRRVVRRVVRVVRRVVRRVRRVVRRVVRVVRRVVRR (SEQ ID NO:8); RVVRVVRRWVRR (SEQ ID NO:9); RRWVRRVRRVWRRVVRVVRRWVRR (SEQ ID NO:10); VRRVWRRVVRVVRRWVRRVRRVWRRVVRVVRRWVRR (SEQ ID NO:11); and RVVRVVRRWVRRVRRVWRRVVRVVRRWVRRVRRVWRRVVRVVRRWRVV (SEQ ID NO:12).

44. The peptide-cargo complex of claim 43 wherein said peptide has antimicrobial activity and said cargo increases the antimicrobial activity of said peptide.

45. A method for inhibiting microbial growth comprising administering an effective amount of at least one peptide selected from the group consisting of:

RVVRVVRRVVRR (SEQ ID NO:4)

RRVVRRVRRVVRRVVRVVRRVVRR (SEQ ID NO: 5);

VRRVVRRVVRVVRRVVRRVRRVVRRVVRVVRRVVRR (SEQ ID NO: 6);

RRVVRRVRRVVRRVVRVVRRVVRRVRRVVRRVVRVVRRVVRR (SEQ ID NO:7);

RVVRVVRRVVRRVRRVVRRVVRVVRRVVRRVRRVVRRVVRVVRRVVRR (SEQ ID NO:8); RVVRVVRRWVRR (SEQ ID NO:9); RRWVRRVRRVWRRVVRVVRRWVRR (SEQ ID NO:10); VRRVWRRVVRVVRRWVRRVRRVWRRVVRVVRRWVRR (SEQ ID NO:11); and RVVRVVRRWVRRVRRVWRRVVRVVRRWVRRVRRVWRRVVRVVRRWRVV (SEQ ID NO:12).

46. The method of claim 45 wherein said peptide inhibits microbial growth in *in vitro* cell culture.

47. A method of inhibiting microbial growth in a subject comprising administering to said subject an effective amount of at least one peptide selected from the group consisting of:

RVVRVVRRVVRR (SEQ ID NO:4)

RRVVRRVRRVVRRVVRVVRRVVRR (SEQ ID NO: 5);

VRRVVRRVVRVVRRVVRRVRRVVRRVVRVVRRVVRR (SEQ ID NO: 6);

RRVVRRVRRVVRRVVRVVRRVVRRVRRVVRRVVRVVRRVVRR (SEQ ID NO:7);

RVVRVVRRVVRRVRRVVRRVVRVVRRVVRRVRRVVRRVVRVVRRVVRR (SEQ ID NO:8); RVVRVVRRWVRR (SEQ ID NO:9); RRWVRRVRRVWRRVVRVVRRWVRR (SEQ ID NO:10); VRRVWRRVVRVVRRWVRRVRRVWRRVVRVVRRWVRR (SEQ ID NO:11); and RVVRVVRRWVRRVRRVWRRVVRVVRRWVRRVRRVWRRVVRVVRRWRVV (SEQ ID NO:12).

48. The method of claim 47 wherein said peptide is administered enterally or parenterally.

49. The method of claim 45 or 47 wherein said peptide is attached to a solid phase substrate.

50. The method of claim 45 or 47 wherein said microbial growth is resistant to antibiotics.